UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8, MONTANA OFFICE
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HELENA, MONTANA 59626-0096

Ref:8MO

September 28, 1999

DSB

MEMORANDUM

SUBJECT: East Helena Superfund Site (National Priorities List Site No. 30)
Five-Year Review Report

FROM: D. Scott Brown, Remedial Project Manager, and
Suzanne Bohan, Enforcement Attorney

THROUGH: Robert L. Fox, Superfund Branch Chief

TO: John F. Wardell, Director, Montana Office, and
Max H. Dodson, Assistant Regional Administrator

The Five-Year Review Report for the East Helena Superfund Site (NPL Site No. 30) has been completed and is attached for your consideration and transmittal to EPA Headquarters.

This five-year review was conducted in accordance with pertinent OSWER Directives (No. 9355.7-02, May 1991; No. 9355.7-02A, July 1994; and No. 9355.7-03A, December 1995) and is consistent with requirements of Sec.121(c) of CERCLA, as amended, and Sec. 300.430 (f) (4) (ii) of the National Contingency Plan. These directives and requirements, and thus the need for a five-year review, apply to the East Helena Superfund Site by virtue of response actions being implemented, which do not allow for unlimited use or unrestricted exposures. That is, wastes produced by the smelting process are, to some extent, being managed in place. This five-year review evaluates whether the response actions taken here remain protective of human health and the environment, despite the persistence of hazardous substances on site.

A recent draft version of this five-year review report has been reviewed by the Montana Department of Environmental Quality and the Lewis and Clark County Health Department. Both agencies have been involved extensively in the response actions taken over the past several years, and both agencies will continue to have major roles in the long-term operation and maintenance of these response actions.

This five-year review report demonstrates that the response actions taken have provided a high level of protection for East Helena residents and their environment. The remedial action for the process ponds operable unit was largely completed in 1995 and 1996, with some long-term

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management of wastes produced during cleanup continuing to this day. The response action (non-time critical removal action) for residential soils and undeveloped lands was largely completed in 1997, with some need for work continuing today and into the future, as well as a continuing education and abatement program being managed by county health professionals.

We recommend acceptance and concurrence of this review.

Five-Year Review
East Helena Smelter Superfund Site
East Helena, Montana
NPL Site No. 30

Prepared by

United States Environmental Protection Agency
Region VIII Montana Office

September 1999

East Helena Smelter Superfund Site
NPL Site No. 30
Five-Year Review

Approved by:

Max H. Dodson, Assistant Regional Administrator
Eco Systems Protection and Remediation Division
U.S. Environmental Protection Agency, Region VIII

9.27.99
Date

1.0 Introduction

1.1 Authority Statement

The U.S. Environmental Protection Agency (EPA) has conducted a Five-Year Review of the East Helena Smelter Superfund Site. This report was prepared in accordance with the requirements of Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. Section 9601, et seq. ("CERCLA"), and Sections 300.400 (f) (4) (ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). As described in these laws and regulations, a Five-Year Review is required when EPA selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining onsite at levels that do not allow for unlimited use and unrestricted exposure.

The Five-Year Review is intended to verify that the remedy is operating and functioning as designed and that institutional controls are in place and are protective, as well as to evaluate whether the response actions taken to date remain protective of human health and the environment. If the review determines that a remedy is no longer protective, appropriate action to correct the remedy may be initiated. Removal of the Site from the National Priorities List (NPL) does not affect the need for a Five-Year Review, nor does it prevent restoring the Site to the NPL without application of the Hazardous Ranking System.

This Five-Year Review was conducted in accordance with the Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-02 "Structure and Components of Five-Year Reviews," (EPA, 1991a); Directive 9355.7-02A, "Supplemental Five-Year Review Guidance," (EPA, 1994); and Directive 9355.7-03A "Second Supplemental Five-Year Review Guidance," (EPA, 1995).

The purpose of this report is to summarize the results of a Five-Year Review of site conditions, provide a statement of protectiveness, and offer general recommendations for a final Record of Decision (ROD). To prepare this report, site-related documents and agreements were examined and monitoring data results were reviewed. Because actions are ongoing, applicable or relevant and appropriate requirements (ARARs) did not undergo comprehensive review (see below). Although no site visits were conducted specifically for this review, EPA or its contractors perform regular site visits (generally one to two times per week) to observe ongoing actions; during the height of the soil removal at the site, oversight was provided by EPA or its representatives generally on a daily basis.

The review material discussed in this report is consistent with a Level Ia review as defined by OSWER Directive 9355.7-02A (EPA, 1994). That guidance reads as follows:

> "Standards review in a five-year review context means the review of ARARs (applicable or relevant and appropriate requirements such as federal or state laws and regulations), and of risk considerations. For an ongoing remedial action (such as at East Helena), it is

not necessary to review ARARs nor in most circumstances to recalculate the risk or perform a new risk assessment. When changes in ARARs necessitate further action, EPA may at any time implement such action through an explanation of significant differences (ESD), ROD (record of decision) amendment, amendment to a consent decree or order, or other enforceable document, as appropriate."

Although a comprehensive review of federal and state laws and regulations (ARARs) was not conducted for this five-year review, the following point is noteworthy: The prescribed standard for arsenic in the waters of Lower Lake, as prescribed by the 1989 Process Ponds Operable Unit Record of Decision, is 0.02 mg/l (dissolved arsenic). This concentration of dissolved arsenic was deemed by EPA and the State to be achievable by known water treatment methods and it was, in 1989, below the federal primary drinking water standard, or maximum contaminant level (mcl) of 0.05 mg/l. Following EPA's issuance of the record of decision, the State of Montana revised its standard for arsenic in state waters. The revised standard was set at 0.018 mg/l, as measured by total recoverable analytical methods. Previously, the state standard for arsenic was 2.2 nanograms/liter (0.0000022 mg/l), but that standard was waived by EPA on the basis of technical impracticability. Because the prescribed standard of 0.02 mg/l is virtually equivalent to the State's revised standard of 0.018 mg/l, EPA concludes that no additional action is warranted at this time.

1.2 Site Description

The East Helena Smelter Superfund Site is located in the community of East Helena, Lewis and Clark County, Montana (see Figure 1-1). The site is the location of a primary lead smelter that has operated for more than 100 years, and has also recovered zinc and other metals during much of its existence. ASARCO, formerly American Smelting and Refining Company, purchased the 80-acre plant from the Helena and Livingston Lead Smelting Company in 1899. Several sources of contamination have been identified at the East Helena Smelter Site:

- Smelter stack emissions
- Fugitive emissions from plant processes such as the blast furnace, dross plant, and sinter plant
- Ore storage area, particularly prior to 1990
- Slag pile (a minor source)
- Process ponds and process fluids circuitry
- Direct discharges to Prickly Pear Creek and East Helena POTW

These sources, both past and current, have impacted the air, soils, surface water and groundwater, vegetation, livestock, wildlife, and human receptors. The East Helena smelter is an active plant and remediation of this site is being implemented while the facility continues operation.

According to the 1990 census, the community of East Helena has a population of 1,538. Approximately 3 miles to the west is the City of Helena, with a population of approximately 25,000. Residential areas of East Helena are within 1/4 mile of the main smelter area, separated from the site by both U.S. Highway 12 and a rail line.

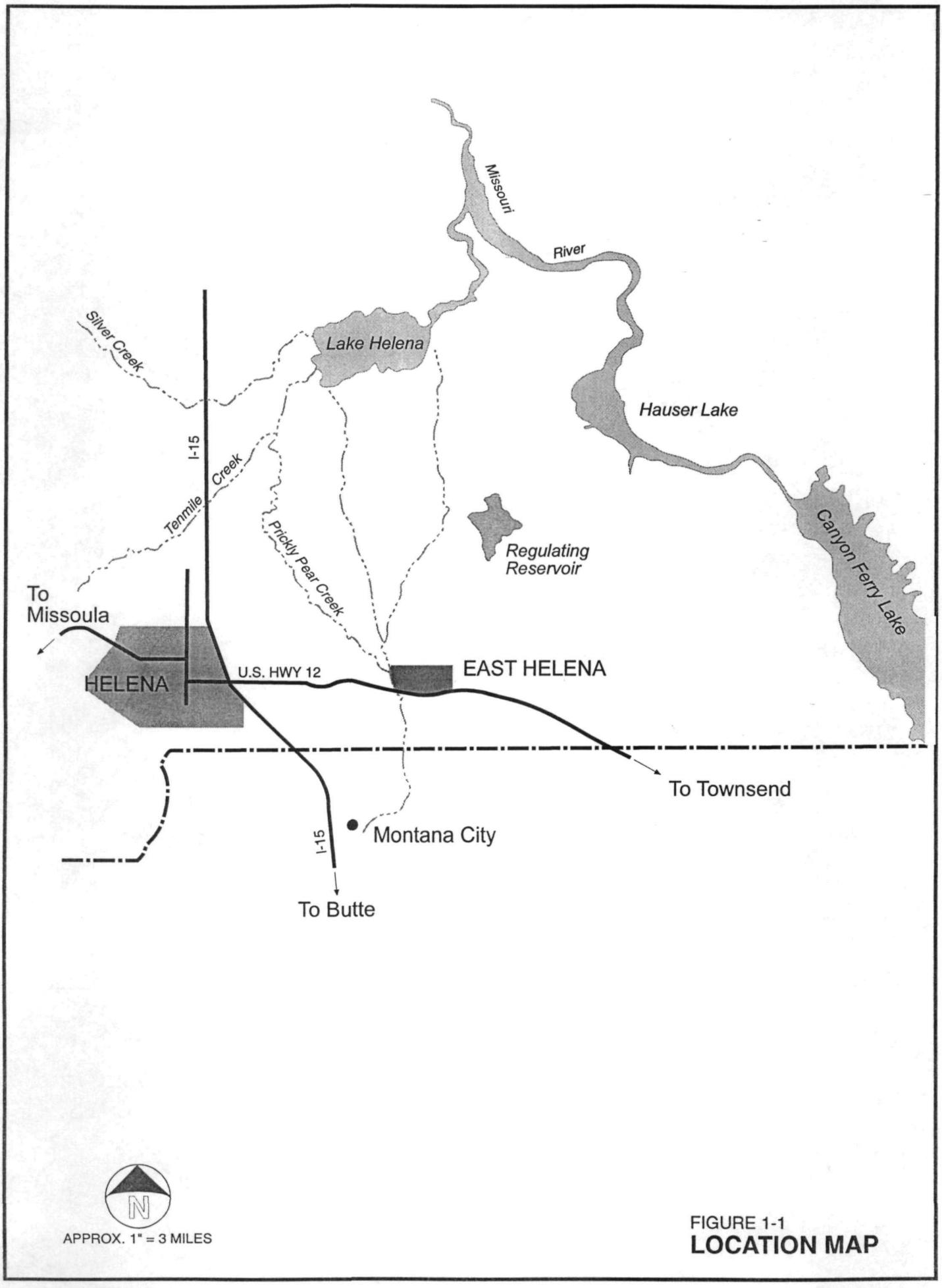

FIGURE 1-1
LOCATION MAP

The site is located in western Montana's Helena Valley. Seasons typically consist of cold winters, wet springs, and warm summers with moderate thunderstorm activity. Much of the moisture in the area comes in the form of late spring and early summer rain, and there are significant winter snow accumulations at higher elevations in the mountains surrounding the Helena Valley. Annual precipitation averages about 10 inches in the Helena area.

The East Helena Smelter Superfund Site is adjacent to Prickly Pear Creek. The site is underlain by unconsolidated alluvium deposited by the ancestral Prickly Pear Creek. The alluvial deposits have variable permeabilities and consist of layers and mixtures of cobbles, gravel, sand, silt, and clay. Underlying the alluvium west and north of the site are fine-grained, Tertiary, volcanic-ash tuff deposits with low permeabilities, having weathered to a fine-grained clay in some locations. Surface water and groundwater in the area flow from south to north, exiting in the northeastern corner of the Helena Valley into Lake Helena (located approximately 10 miles north of the town of East Helena). The smelter site and the East Helena area are shown in Figure 1-2.

1.3 Site History

The East Helena Smelter Superfund Site was added to the National Priorities List (NPL) pursuant to Section 105 of CERCLA in September 1984. The events that led to the site's listing on the NPL included findings of contaminated soils in East Helena residential areas, elevated blood-lead levels in area children, elevated metals levels in the air, and contaminated process ponds over shallow groundwater near the plant.

In 1987, the large, diverse East Helena Smelter Superfund Site was segregated into five operable units (OUs), which are defined as follows:

1. Process Ponds and Fluids, including the Process Ponds and Process Fluids subcircuits, all of which are physically located within the smelter site itself

2. Groundwater, including shallow groundwater under the plant, and a plume of contaminated groundwater that extended beyond the boundaries of the smelter site and into the shallow aquifer underlying a portion of East Helena

3. Surface Soils, Surface Water, Vegetation, Livestock, Fish and Wildlife, and Air, including plant site soils, residential East Helena soils, other Helena Valley soils, Prickly Pear Creek, and Wilson Irrigation Ditch

4. Slag Pile, including the approximately 57-acre slag pile and any contaminated soil under the slag pile

5. Ore Storage Areas, including air, groundwater and surface water effects; most ores today are stored indoors in the ore storage building

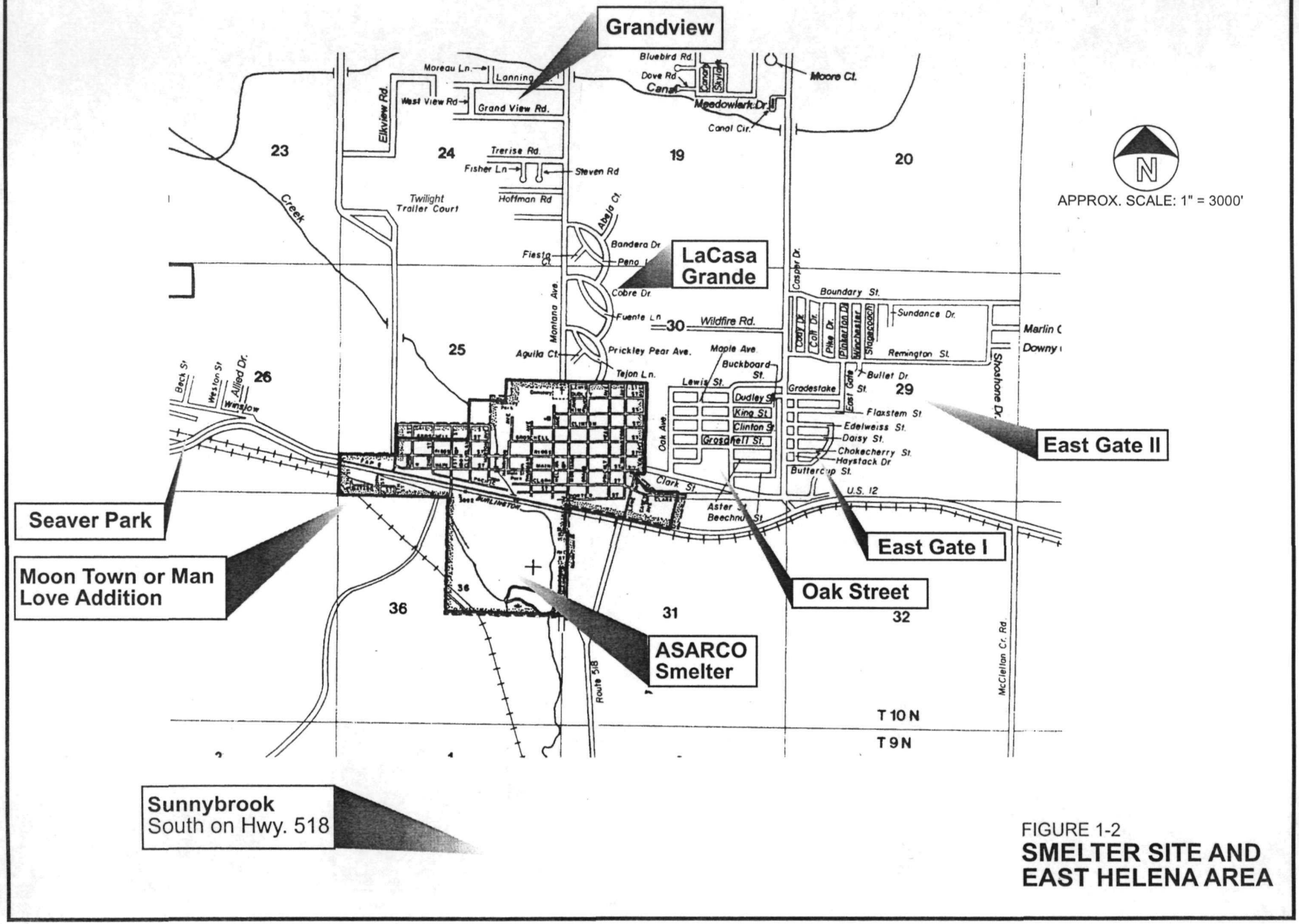

FIGURE 1-2
SMELTER SITE AND EAST HELENA AREA

The operable units were created to expedite progress on the well-characterized OUs while additional study continued on the other OUs.

A ROD was issued in 1989 to address the Process Ponds OU and included remedial activities for Lower Lake, the speiss granulating pond and pit, the acid plant water treatment facility, and Thornock Lake, which was formerly a process pond. These subunits are further described in Section 2.1 and are shown in Figure 2-1.

All remaining source areas such as the process fluids circuitry, surface soils and surface water, groundwater, slag pile, and the ore storage areas were investigated in the late 1980s. In 1990, the *Comprehensive Remedial Investigation/Feasibility Study (RI/FS) for the East Helena Site* (Hydrometrics, 1990) was completed. For project management purposes, the entire project was reorganized shortly after the feasibility study to consolidate the aforementioned operable units.

The sources of contamination at the East Helena Smelter Superfund Site were identified as primary and fugitive emissions, and seepage from process ponds and process fluid circuitry. It was also determined that unpaved streets and alleys, and nonvegetated fields are sources of contaminated, wind-blown dust. The primary contaminants are lead, arsenic, cadmium, and other heavy metals. The affected media include soils, groundwater, surface water, vegetation, livestock, fish and other aquatic organisms, wildlife, and the air of the Helena Valley. The effects of the contamination have been measured over a 100-square-mile area, but concern for receptors and the potential for unacceptable risks are limited to about a 3-mile radius from the smelter. Blood-lead studies conducted several times over the past 20 years indicate that elevated levels of lead in children living in East Helena were strongly correlated with proximity to the smelter.

The draft human health risk assessment concludes that there are unacceptable risks to public health from lead and arsenic contaminated soils. The most likely ways for contaminated soils to enter humans are by ingestion and inhalation. Children, particularly those under the age of 7, are most vulnerable because of their play behavior and because their bodies are still developing. Lead is linked to delays in nervous system development, particularly in young children, and impaired learning. Adults exposed to lead over an extended time face increased risks of high blood pressure. The human digestive tract absorbs lead similar to the way it absorbs calcium, and both elements are stored in the bones and soft tissues. Pregnant or breast-feeding women may pass lead on to the fetus or child. Arsenic, at the concentrations present in East Helena, is linked to increased risk of skin and lung cancers.

Given this information and the high levels of arsenic and lead in the soils of East Helena, EPA initiated a residential soils removal action under an administrative order on consent in 1991.

Since the residential soils removal action has been largely completed, and air quality has improved significantly over the past few years and the Lewis and Clark County Lead Education and Abatement Program has been in operation, the local children's blood-lead levels have dropped considerably. Details of this downward trend in blood-lead levels are discussed in Section 2.3.1 of this report.

2.0 Discussion of Remedial Objectives: Areas of Noncompliance

This section highlights the objectives of the remedial action presented in the Process Ponds Operable Unit ROD, summarizes the progress of the work, and discusses activities not yet implemented. These matters will be discussed as they relate to the three main areas of the project: 1) the process ponds and process fluids; 2) the groundwater; and 3) the remainder of the site, including residential and nearby Helena Valley soils, surface water, Wilson Irrigation Ditch, vegetation, livestock, fish, waterfowl, slag pile, and ore storage areas.

2.1 Process Ponds and Process Fluids

Groundwater contamination was detected in the shallow aquifer under the plant and extended into the aquifer underlying the City of East Helena. Of the constituents detected, arsenic is the most mobile in the groundwater system. Data collected from monitoring wells installed up-gradient of the plant, within the plant boundaries, and downgradient of the plant showed relatively high concentrations of arsenic extending from the plant site to the northwest.

It was determined through site characterization that the process ponds were the primary sources of groundwater contamination, and that they could be remediated separately from other sources. The Process Ponds OU included Lower Lake, former Thornock Lake, the speiss granulating pond and pit, and the acid plant water treatment facility as shown in Figure 2-1 on page 8. For each process pond, the operable unit included the process water and contaminated sediments and soils under each pond to the depth they were a source of groundwater contamination or intersect with groundwater. The major sources of arsenic in the groundwater were the speiss granulating pond and pit and, to a lesser extent, the acid plant water treatment facility and associated sediment drying area.

An accelerated cleanup schedule was applied to the process ponds. The response actions selected for implementation at the process ponds were presented in the Process Ponds ROD (EPA, 1989). These response actions were designed to alleviate the primary threats to public health and the environment, prevent current or future exposure to the contaminated soils, and reduce contaminant migration into the groundwater.

Lower Lake collected and stored water used in the main smelter process water circuit as well as stormwater runoff. The selected remedy for Lower Lake included the following actions:

- Replacement of Lower Lake with two 1-million-gallon storage tanks
- A lined pond for stormwater runoff
- In-place co-precipitation of Lower Lake process waters
- Removal of sediments by dredge, dragline, or industrial vacuum
- Dry sediments on drying pad
- Smelt sediments (recycle) in the smelter process

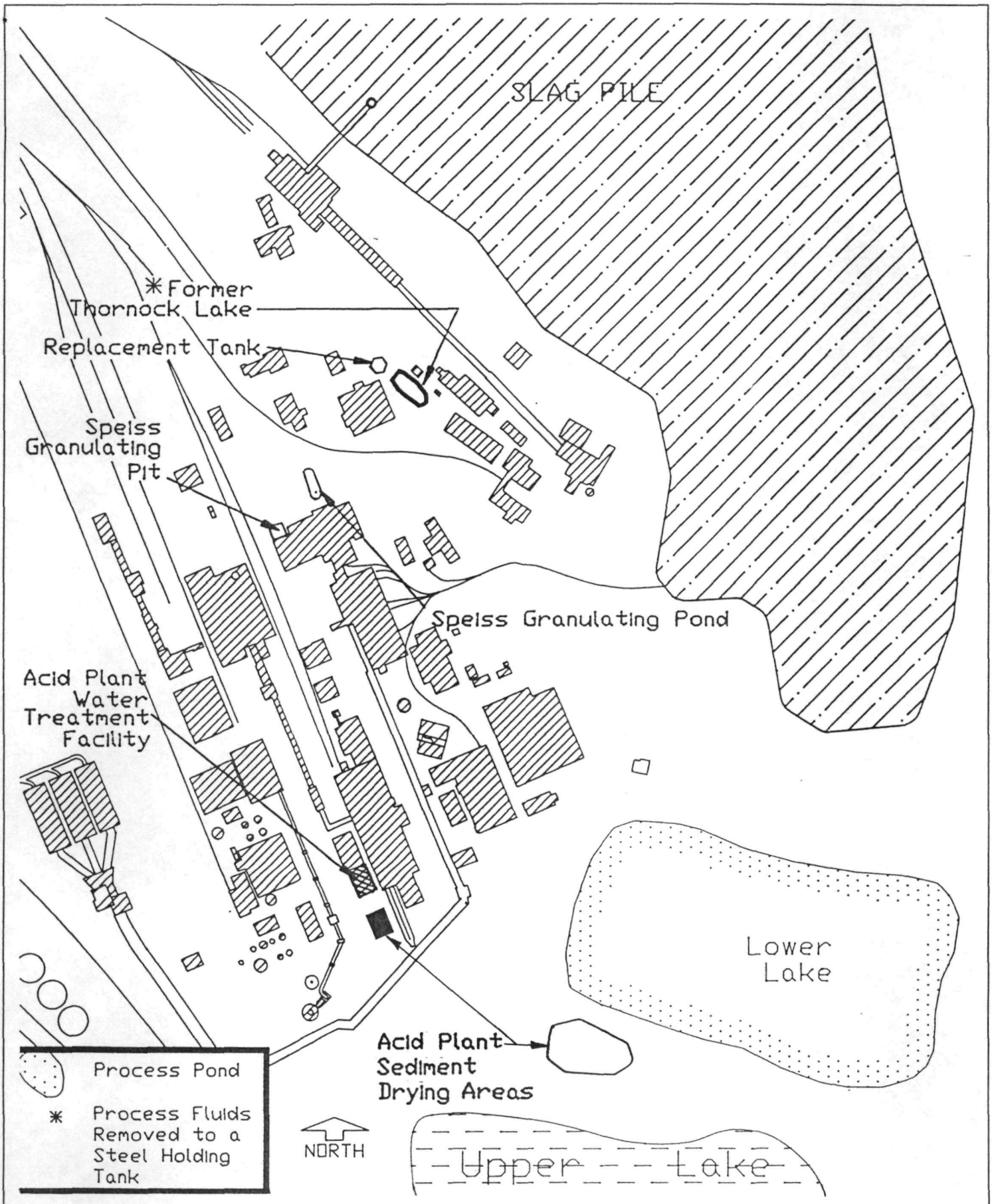

FIGURE 2-1
PROCESS POND LOCATION MAP

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Much of the remedial work associated with Lower Lake has been completed. Two 1-million-gallon storage tanks were constructed to replace Lower Lake. The stormwater collection tank was constructed, and the stormwater system is now addressed under Montana's Stormwater Permit Program. Lower Lake water is being treated through the new High Density Sludge (HDS) Water Treatment Plant onsite, and treatment will continue until all prescribed standards are met consistently. Sediments were dredged from Lower Lake, dried in filter presses, and are in storage onsite awaiting EPA's consideration of ASARCO's proposal to dispose of them at a Corrective Action Management Unit (CAMU). This consideration and other proposed changes to remedial actions are discussed in Section 3.0, Recommendations.

The *speiss pond* stored water that was used in the *speiss pit* to cool the hot speiss from the dross plant as part of a granulation process. The selected remedy for the speiss granulating pond and pit included the following actions:

- Excavate soils
- Smelt soils in the smelter process
- Replace existing pond with a tank and secondary containment facility
- Replace existing pit with a newly lined facility

ASARCO completed all work associated with the speiss granulating pond and pit in 1995.

The *acid plant water treatment facility* removes particulates from the scrubber fluid. The selected remedy for the acid plant water treatment facility included the following actions:

- Replace existing pond and settling system with closed-circuit, filtration-treatment system
- Excavate contaminated soils
- Smelt soils in the smelter process

ASARCO completed all work associated with the acid plant water treatment facility in 1993.

Former Thornock Lake was used to settle suspended solids from the main process water circuit. The selected remedy for former Thornock Lake included the following actions:

- Excavate sediments
- Smelt sediments in smelter process

ASARCO completed all work associated with former Thornock Lake in 1991.

In response to the 1990 Comprehensive RI/FS, the process fluids subcircuits are now being remediated by replacing existing pressure lines, drains, and sumps with a new, process-water-transportation network.

An Explanation of Significant Differences (ESD) is currently being developed to address proposed changes to the selected remedy for Lower Lake specified in the Process Ponds ROD. More information about the ESD is found in Section 3.0, Recommendations.

2.2 Groundwater

Groundwater will be addressed under the authority of the Resource Conservation and Recovery Act (RCRA). This transfer of authority is based upon a determination by EPA that the RCRA Corrective Action program is better suited for application to the operating ASARCO smelter than the CERCLA program, because RCRA allows the framing of remedial investigation steps and the adoption of corrective measures in a manner tailored to circumstances at this operating facility. The East Helena RCRA Consent Decree was signed by EPA and ASARCO and entered by the U.S. District Court of Montana on May 5, 1998. ASARCO has committed to long-term groundwater monitoring. Samples are collected from key groundwater stations in East Helena and in the vicinity of the smelter twice each year. More than 10 years of water monitoring data have been collected.

Depth to groundwater within the study area ranges from approximately 6 feet to 60 feet below the ground surface. Groundwater flows through shallow (water table), intermediate, and deep alluvial sand/gravel aquifers. Groundwater flow in the plant site area is to the north and to the northwest. Upper Lake, Lower Lake, and Prickly Pear Creek are local sources of recharge to shallow and intermediate aquifers. Other plant area sources, including the speiss pond and pit, the acid plant reclaim area, and Thornock Lake, also contributed recharge within the plant site area.

The RI/FS Investigation, which involved water quality sampling and analysis from 1984 through 1987, showed that the shallow aquifer (upper 10 feet of the saturated zone) under the plant, and to some extent under East Helena, had elevated arsenic concentrations. Concentrations of other metals, including cadmium and lead, were generally low in the shallow, intermediate, and deep aquifers. Contrary to arsenic concentrations, the concentration of other metals in groundwater was not contourable and did not show any identifiable pattern relative to plant or offsite concentrations. Water quality analyses from the intermediate aquifer underlying the shallow aquifer do not show elevated arsenic (or other metals) concentrations. Water quality analyses from the deep aquifer showed low concentrations of arsenic, metals, sulfate, and total dissolved solids (TDS), but showed no effects from plant site sources.

In response to the remedial investigation, and in accordance with EPA direction, post-RI/FS groundwater and surface water monitoring was initiated in 1990, and has been conducted on a quarterly or biannual basis for nine seasons. There is always an expected natural variability in groundwater, resulting in fluctuations in the physical and chemical characteristics. However, the primary purpose of the post-RI/FS monitoring is to monitor the effects on groundwater from implementation of the process ponds remedial actions in accordance with the Process Ponds ROD.

Data collected from two shallow aquifer upgradient wells located south of the plant indicated average arsenic concentrations of 0.009 mg/L and 0.014 mg/L (DH-2, DH-3). These wells are located upgradient of the plant and are therefore not influenced by plant activities. Arsenic concentrations in groundwater from wells located near the acid plant settling pond and nearby sediment drying areas have dropped from 250 mg/L in the fall of 1992 to less than 35 mg/L in the fall of 1997 (DH-19). Wells located in the former acid plant sediment drying area adjacent to

Lower Lake showed a general decline of arsenic from about 400 mg/L in early 1991 to about 70 mg/L in 1994 (DH-29). Historical water quality data obtained from Lower Lake in 1982 through 1983 showed dissolved arsenic concentrations of about 200 mg/L. Samples obtained from Lower Lake in May 1998, showed arsenic levels of 0.049 mg/L. Downgradient wells include monitoring wells and private wells within and near the City of East Helena. Generally, arsenic concentrations found downgradient of the plant have remained constant or have decreased during the study period. Average arsenic concentrations found in the private wells (PW-1 and PW-2) range from below laboratory detection limits (0.005 mg/L) to 0.073 mg/L, while average concentrations of arsenic in monitoring wells EH-52 and EH-58 range from nondetectable to 0.769 mg/L. Exceptions to this trend are the observed increases in arsenic concentrations detected in wells EH-51 and EH-60. With the exception of one, all of the private wells are completed in the intermediate or deep portions of the aquifer. The highest average arsenic concentration is present in the one private well completed in the shallow aquifer. This well is not used and the pump has been removed. All residences within the City of East Helena use city water and none of the private wells are used for potable water supplies. Table 2-1 shows some of the sampling results collected since 1991 from the aforementioned wells. Groundwater sample locations are shown in Figure 2-2.

Table 2-1
Groundwater Monitoring Data
(All Values Are Dissolved Arsenic, mg/L)*

Monitoring Well Description	Sampling Events			
	Spring 1991	Spring 1993	Spring 1995	Spring 1997
Upgradient Wells				
DH-2	0.012	0.008	0.007	0.009
DH-3	0.018	0.01	0.011	0.011
Near Acid Plant Settling Pond				
DH-19	105.0	61.0	71.03	46.73
Acid Plant Sediment Drying Area (Near Lower Lake)				
DH-29	400.0	191	74.06	50.62
Private Wells				
PW-1	0.013	0.019	0.018	0.02
PW-2	0.009	<0.004	<0.004	<0.005
Offsite Monitoring Wells				
EH-51	0.083	0.12	0.082	0.351
EH-52	0.875	0.59	0.47	0.45
EH-58	0.01	0.014	<0.004	<0.005
EH-60	5.0	6.0	8.411	No Data Available

*Federal standards for arsenic in drinking water is 0.05 mg/L. The state standard for groundwater is 0.018 mg/L.

FIGURE 2-2
AIR, SURFACE WATER, SEDIMENT AND GROUNDWATER MONITORING LOCATIONS

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FIGURE 2-2
AIR, SURFACE WATER, SEDIMENT AND GROUNDWATER MONITORING LOCATIONS

2.3 Remainder of the Site

The remainder of the site includes residential and nearby Helena Valley soils, surface water, Wilson Irrigation Ditch, vegetation, livestock, fish, waterfowl, slag pile, and ore storage areas. These areas of the project are discussed in more detail below.

2.3.1 Residential and Nearby Helena Valley Surface Soils

In the summer of 1991, EPA and ASARCO entered into an Administrative Order of Consent (AOC) to begin a residential soil removal action on a non-time-critical basis. An action memorandum was prepared for this removal action and signed by EPA on July 19, 1991. Removal of soils with high concentrations of lead, cadmium, arsenic, and other hazardous substances from residential yards, parks, roads, alleys, and road aprons has been ongoing since the spring of 1991. Lead is the primary contaminant of concern and triggered the removal of yards.

ASARCO has excavated and replaced more than 540 residential yards, 400 sections of adjacent alleys and road aprons, 5 public parks, 3 day-care centers, 2 schools, 2 gas stations, 4 parking lots, 4,200 linear feet of irrigation ditch, and a 45-acre field planned for development. In addition, a long-term monitoring program is in effect. The long-term monitoring program includes annual sampling of a percentage of the remediated yards to determine the potential for reintroduction of metals in replaced soils. To date, all long-term residential sites have had stable "background" lead concentrations throughout the 5-year monitoring period. The soil-removal action is an ongoing process. To provide protectiveness to the community, yards continue to be remediated on an as-needed basis. The soil removal program today includes the removal and replacement of soils in residential yards where children younger than 7 years old or pregnant women reside permanently and where documented soil-lead levels above 1,000 mg/kg exist in at least one sampling section of the yard. All other sections of the qualifying yards with lead levels meeting or exceeding the health-based level of 500 mg/kg are also replaced.

There remains in East Helena more than 200 yards with surface soil-lead levels exceeding 1,000 mg/kg. These yards are not scheduled for removal yet, because no young children or pregnant women reside at these locations. As new families move in, or the status of the residents change, these yards will be added to the program. If a young family moves into a home where the yard has not previously been sampled, they can request that the yard be sampled. If elevated levels are found, the yards will be excavated and replaced.

An additional component of the remedial actions implemented at the site includes the Lead Education and Abatement Program administered by the Lewis and Clark City-County Health Department. The purpose of the program is to educate the community, reduce or prevent exposure to lead, particularly for children, and to collect data relevant to long-term planning, administration of institutional controls, and long-term management of lead poisoning risks. The Lead Education and Abatement program tasks include the following:

- Educating East Helena families about lead exposure
- Screening children in the East Helena area for lead poisoning
- Encouraging and maintaining open communications among all stakeholders in East Helena
- Conducting environmental assessments where need is indicated
- Continuing oversight of remediation and soil monitoring in East Helena
- Administering the exterior lead-based paint abatement contract

EPA's goal at this site is to reduce exposure to lead and arsenic to the lowest possible level. In achieving this goal, special attention is paid and concern exists for young children whose blood-lead level approaches or exceeds 10 μg/dl. Additionally, it has been EPA's goal to reduce East Helena children's overall average blood-lead concentration. The National Centers for Disease Control (CDC) advises all public health agencies to be concerned and recommends taking action whenever a young child's blood-lead level approaches or exceeds 10 μg/dl.

Results of blood-lead testing in recent years have shown a marked decrease in blood-lead levels of East Helena children (see Table 2-2). As shown in Table 2-2, in 1976 all of the 90 children tested showed blood-lead levels of 10 μg/dl or greater, with the average of 28 μg/dl. By 1989, prior to the initiation of the soil removal action, 33 percent of the 191 children tested showed blood-lead levels of 10 μg/dl or greater. As Table 2-2 illustrates, in 1998, 61 children were tested, and from that group, only 1 child (2 percent) had a blood-lead level greater than 10 μg/dl, while none had levels greater than 15 μg/dl. EPA believes this reduction in blood-lead levels is due to the intervention and education provided by the Lewis and Clark Lead Education and Abatement Program, the reductions in air emissions at the Asarco plant and the large-scale, soil removal action.

Table 2-2
East Helena Children Lead-in-Blood Ratios (as of 8/26/98)

Year	No. Tested	No. Elevated (10 μg/dl +)[a]	Percent Elevated	Highest Value	Average
1976	90	90	100%	68 μg/dl	28 μg/dl
1983	98[b]	67	66%	35 μg/dl	14 μg/dl
1988-89	191	63	33%	40 μg/dl	10 μg/dl
1995	88	6	7%	14 μg/dl	5 μg/dl
1996	95	2	3%	10 μg/dl	4 μg/dl
1997	109	6	6%	21 μg/dl[c]	4 μg/dl
1998	61 (6/30)	1	2%	10 μg/dl	Less than 4 μg/dl

[a]Number of new children exhibiting lead-in-blood ratios equal to or greater than 10 μg/dl.
[b]Ninety-eight children residing within 1 mile of the smelter.
[c]The child tested at 21 μg/dl in 1997; following intervention by Lewis and Clark County Lead Program health professionals in 1998, the child tested at 8 μg/dl.

2.3.2 Surface Water

Irrigation ditches, including Wilson Ditch which draws water from Upper Lake, and other ditches located north and east of East Helena, remove flow from Prickly Pear Creek during summer and fall. A small portion of the water from Upper Lake is also used by the plant. Prickly Pear Creek is generally dry downstream of the irrigation ditches during late summer and fall. Prickly Pear Creek water quality upstream of the plant site is generally good but contains some arsenic and metals as a result of historic upstream mining and land disturbances. The site remedial investigation found trace element values at site PPC-3 located upstream of the smelter, which are typical of upstream water quality.

Groundwater seepage across the berm from Lower Lake to Prickly Pear Creek was shown to be a source of arsenic to Prickly Pear Creek. Specifically, the instream dissolved arsenic concentration increased from 0.007 mg/L to 0.024 mg/L between surface water stations PPC-3 (upstream) and PPC-7 (downstream) in June 1985. Surface water sampling data from the RI/FS are presented in Table 2-3. Sampling locations are shown in Figure 2-2.

Table 2-3
Surface Water Quality Data Collected from Prickly Pear Creek as Presented in the Comprehensive RI/FS
June 1985 (all values are total metals, mg/L)

Parameter	PPC-3	PPC-7
Arsenic	0.007	0.024
Cadmium	0.003	<0.003
Copper	0.011	<0.015
Lead	0.007	0.018
Zinc	0.063	0.076

Post-RI/FS monitoring data from biannual samples collected from 1990 through 1994 showed water quality to be similar to that sampled during the RI/FS. No significant changes to Prickly Pear Creek over time were observed for arsenic, the element of primary concern. In May 1997, similar to the RI, arsenic concentrations were elevated in samples collected at sites downstream from Lower Lake (PPC-7) when compared to concentrations upstream (PPC-3) as shown in Table 2-4.

Table 2-4
Surface Water Quality Data Collected from Prickly Pear Creek Biannual Sampling
May 1997 (all values are total metals, mg/L)

Parameter	PPC-3	PPC-7
Arsenic	0.008	0.01
Cadmium	<0.001	0.001
Copper	0.015	0.017
Lead	0.02	0.024
Zinc	0.212	0.19

ASARCO continues to perform long-term monitoring of surface water, collecting samples from key surface water stations from Prickly Pear Creek twice each year.

As with groundwater, surface water will be addressed in the future under the authority of the Resource Conservation and Recovery Act (RCRA).

The May 1997 data show that at both the upstream and downstream sampling locations, total arsenic meets human health-based criteria.

2.3.3 Wilson Irrigation Ditch

Water is diverted from Upper Lake to Wilson Ditch for irrigation use. The quality of water in Wilson Irrigation Ditch is essentially the same as Prickly Pear Creek upstream of the ASARCO plant. However, during site characterization, elevated lead and arsenic levels were found in the bottom sediments collected from Wilson Ditch. It was apparent that the source of these contaminated sediments was runoff from ore storage areas that have since been eliminated. In 1993 and 1994, approximately 3,700 lineal feet of the ditch, which passed through residential areas, were excavated and backfilled with clean soils. The ditch continues under U.S. Highway 12 and northward onto agricultural lands (see Figure 2-2). This action was carried out under authority of the residential administrative order on consent. EPA has determined that no further response action is required for the portion of Wilson Irrigation Ditch which passes through residential areas.

2.3.4 Vegetation

Vegetable and grain crop surveys were conducted during the remedial investigation to define the patterns of production and consumption of vegetables grown in the East Helena area, and of wheat grown in the Helena Valley. The elevated metals levels in garden vegetables prompted a set of recommendations from EPA and Montana Department of Environmental Health and Sciences (now Montana Department of Environmental Quality (MDEQ)) for the safe handling of vegetables grown in East Helena gardens. Suggestions included limiting the consumption of leafy vegetables, peeling and washing underground vegetables, and thoroughly washing other vegetables and fruits. Education regarding consumption of locally grown vegetables is provided to the East Helena community through the Lewis and Clark Lead Education and Abatement Program.

As has been discussed, more than 200 yards remain in East Helena with soil lead concentrations well in excess of 200 mg/kg. Additionally, there are also considerable undeveloped lands outside the East Helena residential area with soil lead concentrations in excess of 200 mg/kg. EPA recommends that vegetable gardens should not be developed in soils with lead concentrations exceeding 200 mg/kg. Therefore, a voluntary program is in place in East Helena allowing and encouraging area residents whose yards have not been cleaned up to replace their garden soils with clean soils. ASARCO provides those soils at no cost to the homeowner.

Also, it appears that some grain fields in the study area are producing crops containing elevated concentrations of arsenic, cadmium, and lead. These fields are relatively close to the plant site. Only cadmium is significantly enriched above background in fields located more than 3 miles from the plant. Fields located more than 4 miles from the plant do not show significantly elevated concentrations above background of any element. Although some portion of the grain produced in the valley is consumed locally, agricultural products (wheat and barley) usually undergo significant processing prior to human consumption. During processing, the products grown in the Helena Valley are likely to be mixed with products from other non-impacted areas such that the resulting metals concentrations in the processed product should not be of concern.

2.3.5 Livestock

Two studies conducted during the remedial investigation on cattle of the Helena Valley identified elevated levels of metals in the local cattle. A survey in 1985 (EPA, 1987b) concentrated on the levels of metals and arsenic in cattle blood and hair. A subsequent investigation (Hydrometrics, 1990) concentrated on levels of metals and arsenic in cattle livers, kidneys, and muscle tissue. The primary ingestion of livestock products by humans is muscle tissue, which is not generally metal-enriched in Helena Valley livestock. Occasional ingestion of beef liver or kidney tissue with elevated concentrations of arsenic or cadmium is believed to present a low risk to consumers. These beef products are typically associated with lower consumption levels compared to beef muscle; consequently, exposure potential is believed to be relatively low. Risk levels increase, however, if individuals ingest beef liver or kidney from locally raised cattle on a regular basis. It has been proposed that the Lewis and Clark Lead Education and Abatement Program include education to discourage liver and kidney consumption from locally raised livestock.

2.3.6 Fish

The U.S. Fish and Wildlife Service report (U.S. Fish and Wildlife, 1997) concluded that metals concentrations in sediments and biota collected in Prickly Pear Creek upstream and downstream of the East Helena Smelter Superfund Site were not significantly different. However, metals concentrations appeared elevated at most Prickly Pear Creek sampling locations when compared to sediment and biota from reference sites. The U.S. Fish and Wildlife Service recommended periodic monitoring of the fish to evaluate changes in temporal trends in lead exposure. The State of Montana has designated Prickly Pear Creek as an I-Class stream, suitable for industrial uses. However, the state has a long-term goal to manage Prickly Pear Creek in such a way as to eventually upgrade it to a Class B-1 stream, with the capability to support a healthy, self-sustaining salmonid fishery.

2.3.7 Waterfowl

The U.S. Fish and Wildlife Service's 1997 Lake Helena study also addressed waterfowl. Lake Helena mallards exhibited higher blood-lead concentrations than mallards tested in Canyon Ferry Reservoir. The study concluded that elevated metals in Lake Helena sediments could contribute to the higher blood-lead in mallards. The U.S. Fish and Wildlife Service recommended additional monitoring and sampling activities. Through the RCRA program, EPA will further evaluate the situation with respect to waterfowl, and determine whether additional action is warranted.

2.3.8 Slag Pile

Investigations indicate that the materials contained in the slag pile did not leach significantly and had minimal impacts, if any, on nearby Prickly Pear Creek or the shallow groundwater system. In addition, in 1990, ASARCO changed its smelter practice from depositing granulated slag on the slag pile to the preparation of cast slugs of slag. This practice dramatically reduced the available fine-sized materials subject to wind and water erosion. The slag pile will be further addressed under RCRA.

2.3.9 Ore Storage Areas

It was determined that the ore storage areas impacted both groundwater and surface water conditions, as well as contributed to the concentration of lead particulate in East Helena. ASARCO completed construction of a new, completely enclosed ore concentrates storage and handling building in December 1990 (see Figure 2-1). MDEQ continues to collect data to monitor air emissions from the plant, including the new ore storage building. The data show a general decline in particulate emissions and lead in the air of East Helena. A sample of the air monitoring data is shown in Table 2-5. The Federal and State standards for lead emissions remains at 1.5 $\mu g/m^3$ as measured over a 3-month period. If further action is required, it will be addressed under the authority of RCRA and Montana's Clean Air Act.

Table 2-5
Air Monitoring Data Collected from Hi-Volume Samplers

Monitoring Site	Year	Lead ($\mu g/m^3$)	Suspended Particulates ($\mu g/m^3$)
Fire Hall	1988	3.46	66
	1989	3.00	65
	1990	2.54	57
	1991	2.83	60
	1992	3.28	68
	1993	3.42	62
	1994	5.32	69
	1995	3.68	61
	1996	2.21	60
	1997	0.93	46
	1998	Incomplete data	42
Dartman Field	1988	2.08	52
	1989	1.37	40
	1990	1.21	39
	1991	1.44	31
	1992	1.16	38
	1993	1.52	36
	1994	1.72	39
	1995	1.71	36
	1996	0.98	39
	1997	0.45	35
	1998	Incomplete data	33
Old Railroad	1989	Incomplete data	41
	1990	1.12	40
	1991	0.96	34
	1992	1.50	37
	1993	1.07	37
	1994	1.24	35
	1995	1.18	35
	1996	1.00	46
	1997	0.48	35
	1998	Incomplete data	30
Prickly Pear Creek	1993	Incomplete data	53
	1994	3.93	58
	1995	3.65	53
	1996	2.23	55
	1997	0.99	46
	1998	Incomplete data	40

3.0 Recommendations

3.1 Process Ponds and Process Fluids

An Explanation of Significant Differences (ESD) to the Process Ponds Operable Unit ROD (EPA, 1989) is needed and will be completed shortly after release of the five-year review report. The ESD will address the following proposed changes to the selected remedy:

- Treatment of Lower Lake Water–The Process Ponds Operable Unit ROD identified in situ treatment as the method by which Lower Lake water would be cleaned up. ASARCO constructed the High Density Sludge (HDS) facility in December 1994, primarily for the purpose of treating acid plant water and then proposed using the HDS facility to treat Lower Lake water. EPA responded by asking ASARCO to obtain an MPDES discharge permit for discharges from the HDS facility. ASARCO has obtained an MPDES permit. EPA believes the HDS facility or other water treatment facilities have the capability to meet or exceed the efficiency of in situ technology for Lower Lake water.

- Management of Stormwater Runoff–The Process Ponds ROD establishes a number of requirements for managing stormwater runoff to ensure it would not reach the Process Ponds. In meetings with EPA and State Superfund and Water Quality Division (WQD) staff in 1995, ASARCO demonstrated that the flow of stormwater from the plant would not reach Lower Lake. The focus was then shifted to situations in which stormwater runoff could reach Prickly Pear Creek. In early 1996, ASARCO met with WQD to discuss options for managing stormwater runoff. In October 1997, ASARCO completed an extensive stormwater system improvement project pursuant to its stormwater permit, under the direction of the WQD. EPA believes that plant stormwater is most appropriately managed through the state stormwater runoff permit program, and therefore will eliminate all stormwater management requirements identified in the Process Ponds ROD.

- Disposition of Lower Lake Sediments–Sediments excavated from Lower Lake are currently located in the Lower Lake sludge stockpile. As an interim measure, ASARCO has placed a large tarp over the stockpile and initiated other run-on and runoff controls. The Process Ponds ROD identified smelting of the sediments as the preferred remedy. ASARCO has proposed to permanently dispose of the sediments in an onsite landfill or Corrective Action Management Unit (CAMU) as part of RCRA corrective action measures. The disposition of the sediments will be addressed through the RCRA process, and EPA anticipates no additional CERCLA requirements for these materials.

- Disposition of Soils and Sediments Located Between Upper Lake and Lower Lake–The 1993 Explanation of Significant Differences (EPA, 1993) identified the acid plant sediment drying pad and underlying soils, located between Upper and Lower Lakes, as a source of arsenic for Lower Lake. Consequently, the ESD called for the removal of contaminated sediments and soils in this area. In 1996, ASARCO collected soil samples from beneath the drying pad to determine if arsenic and metals leachate concentrations were sufficiently low to defer excavation of soils from beneath the pad. EPA and the

state received the sampling results and concurred in the deferral of the planned excavation. Additional evaluation of the pad and underlying soils is required before a final determination can be made. The RCRA corrective action process is the most appropriate vehicle for performing the additional evaluation and any necessary excavation. EPA anticipates no additional CERCLA requirements for these materials.

3.2 Groundwater

ASARCO will continue to collect sampling data to monitor any changes in the groundwater. If additional action is required, it will be completed under the RCRA authority.

3.3 Remainder of the Site

The remainder of the site includes the existing residential lands, undeveloped lands, surface water, vegetation, and livestock.

In October 1997, EPA issued a Proposed Plan for existing residential lands and undeveloped lands. A final decision regarding the preferred alternative will not be made until EPA has completed an update to the baseline risk assessment. Two site risk assessments have previously been published by ASARCO. These studies focused on identifying the reasonable maximum risks for East Helena residents following all scheduled soil and sediment removals in the residential areas. Although EPA and the State used the information presented in the two evaluations to establish target cleanup levels and remediation strategies for East Helena, the risk assessments were never formally accepted by EPA or the State.

Following is a summary of the actions being considered by EPA for the remainder of the site:

3.3.1 Existing Residential Lands

It is proposed that the current soil-removal program be continued, but include the following:

- Remove soil in residential yards with lead-in-soil concentrations less than 1,000 mg/kg whenever environmental or biological testing of children demonstrates health effects from soil exposure, irrespective of lead concentrations.

- Remediate vacant lots if they are planned for construction and have lead-in-soil concentrations greater than 500 mg/kg.

Institutional controls are necessary to protect the remedy. EPA is coordinating with Lewis and Clark County Health Department to implement the following institutional controls:

- *Notification of the Lewis and Clark City-County Health Department by the property owner or by contractors prior to any soil disturbance.* The notification would be requested for all construction that might disturb contaminated soils, such that the Health Department could make a determination of potential impacts, then provide education,

advice, sample designs, etc., as required. Although this would be initiated as a voluntary program, EPA will continue discussions to have permitting requirements met through local ordinance (City of East Helena).

- *Preparation and implementation of an approved plan of action prior to the disturbance of lead-contaminated soils.* The scope of the plan of action would be based on the type of disturbance. Simple construction (for example, excavation for fence posts, or construction of a slab by a property owner) would require a simple plan or a standard permit form. More complex construction (such as sewer lines or basement construction) would require a more comprehensive plan, including design drawings detailing methods for dealing with the contaminated materials encountered.

- *Sampling of soils.* If construction is planned at a site, soil sampling would be provided at no cost to the property owner or contractors. The sampling would be based on the scope of the proposed construction, but would generally include pre- and post-construction sampling to ensure that no contamination or recontamination had occurred.

- *Information concerning guidelines and recommended procedures for construction in and around lead-contaminated soil.* These would generally be in the form of preprinted information concerning construction techniques and how to deal with contaminated soils. The information would be distributed to property owners and contractors planning construction in potentially contaminated areas.

- *Control of contaminated soil disposal and replacement soil supply.* Wherever required, contaminated soils would be removed for disposal in an EPA-approved repository (likely in the East Fields), and clean soils would be supplied to replace contaminated soils excavated during the construction project. The Health Department would assure that the contaminated soils were properly disposed and that replacement soils were uncontaminated. There would be no cost to the property owner for disposal of contaminated soils or for the supply of appropriate clean replacement soils.

- *Inspection services.* The Health Department would provide inspection services to oversee and provide advice regarding construction in areas where contaminated soils could be impacted by property owner or contractor activities. The inspection would help assure that proper procedures are followed during construction and that proper techniques are implemented for disposal and replacement of soils.

3.3.2 Undeveloped Lands

Several hundreds of acres of undeveloped lands surrounding the residential areas of East Helena exhibit elevated concentrations of lead and arsenic in the soils and may pose a current or future risk to East Helena residents. These include agricultural lands, areas adjacent to water-spreading ditches and channels, large residential tracts, and railroad rights-of-way. Sampling has been completed in these areas; however, they are largely and widely dispersed, and additional sampling will be performed to better characterize the nature and extent of contamination. Decisions concerning the need for remediation in these areas will be made on a case-by-case

basis, depending on concentrations of contaminants, proximity to existing residential areas, timing of expected development, and the likelihood of exposure.

When agricultural lands are proposed for residential development or other new construction, it is necessary to evaluate the soils to determine if remediation is required prior to development.

Areas adjacent to water-spreading ditches and channels are likely to have much higher levels of lead and arsenic. Sampling results from these areas indicate contamination exists at depths of 4 to 6 inches, and in some locations as deep as 16 inches. If these areas are proposed for residential development, decisions concerning remediation techniques should be made on a case-by-case basis, and be based on site-specific sampling and the risk to the residents.

Undeveloped areas of large residential yards (greater than 1 acre) will be cleaned up as required. The decision concerning the specific aspects of cleanup, such as the required area, depth of excavation, and cleanup techniques, shall be made on a case-by-case basis, and be based on site-specific sampling and the risk to the residents.

Where it is demonstrated that contamination in railroad rights-of-way poses an unacceptable risk to residents, remediation will be required. Decisions concerning areas requiring remediation will be made on a case-by-case basis and be based on site-specific sampling information and the risk to the residents.

The existing agricultural areas near East Helena have significantly elevated levels of metals and arsenic. However, there is no indication that these areas currently pose a direct risk to human health, as long as they remain in active agricultural production with appropriate vegetative cover. The vegetative cover is important for two reasons. The first is that an appropriately maintained cover will significantly reduce generation of fugitive dust, which could recontaminate nearby residential areas that have already been remediated. The second reason is more subtle. The evidence from the vegetation and cattle studies indicates that the primary method for contamination of cattle forage crops (and therefore of the cattle) is airborne surface deposition, most likely from the surrounding soils. It can be reasonably assumed that there will be an inverse relationship between surface deposition on forage crops and the quality of the vegetative cover. In other words, if an area is overgrazed, more of the surface soils will be exposed and available for disturbance and deposition on the forage plants. Conversely, an appropriately maintained vegetative cover (without overgrazing) will leave less soil exposed and available for deposition on the forage plants.

The institutional measures for existing agricultural areas therefore focus on maintaining and improving appropriate management practices. For agricultural areas where there is risk that soils exceed 500 mg/kg lead, a voluntary program of Best Agricultural Management Practices (BAMPs) should be implemented. The BAMP program would be primarily an educational program and would be implemented with the residential Lead Education and Abatement Program. Because the management practices would be different for crop lands than for range lands, the program would have two different educational components.

The majority of the crop lands around East Helena are planted in grain of primarily wheat and barley. The education program for these lands would encourage the following, primarily to reduce the production of fugitive dust:

- Minimum tillage practices. Till with chisel bars and only a single tillage pass rather than tilling with standard plows and discs. The chisel bars till only about 1 inch deep and reduce the disturbance of the soils.

- Minimize autumn burning and tilling. Allow the stubble to remain in the fields over the winter rather than burning or turning the stubble under in the fall after the harvest. This tends to hold the soil and reduce winter dust production. For winter wheat, which requires autumn tilling, minimize the time between tilling and planting to encourage plant cover as soon as possible in the autumn.

For range lands, the following practices would be encouraged, primarily through the avoidance of overgrazing:

- Maintain or promote adequate amounts of vegetative cover, including standing plant material and litter, to support infiltration, maintain soil moisture storage, and stabilize the soils.

- Maintain or promote subsurface soil conditions that support permeability rates appropriate to climate and soils.

- Promote the opportunity for seedling establishment of appropriate plant species when climatic conditions and space allow.

An integral part of the BAMP program would be periodic inspection of the range lands and crop lands to identify areas where improvements in management practices are possible. The inspection program would consist of the following:

- An overflight of the area using remote sensing technologies (including infrared photography) to identify areas where the crop or grazing practices can be improved.

- An on-the-ground inspection by a team of agricultural specialists, including soil scientists, range scientists, crop scientists, and regulatory personnel.

- Contact with the owners of any properties where management practices can be improved. Encourage improvement in management practices and distribution of educational materials.

Because contamination above health-based levels may be left in place under this alternative, monitoring would be required at least every 5 years. Monitoring for soils metals would occur at approximately 10 percent of the agricultural lands every 5 years. Monitoring should be done at sites that have been sampled previously to provide a baseline for evaluation of any changes. In

addition, monitoring should include tests of the crops and cattle muscle tissue (especially liver and kidneys) to determine if the BAMPs are effective.

3.3.3 Surface Water

Continue to collect and thoroughly review surface water monitoring data twice yearly.

3.3.4 Vegetation

Continue to provide educational information regarding consumption of locally grown vegetables. Educational information shall be provided and distributed by the Lewis and Clark Lead Education and Abatement Program.

3.3.5 Livestock

Continue to provide educational information to discourage liver and kidney consumption from locally raised livestock. Educational information shall be provided and distributed by the Lewis and Clark Lead Education and Abatement Program.

4.0 Statement of Protectiveness

The East Helena Superfund site includes an operating lead smelter that is 110 years old; residential and commercial structures for a population of about 2,200 people (this estimate includes subdivisions outside of East Helena proper); several hundreds of acres of agricultural lands supporting crops and livestock; a reach of stream and alluvium; riparian lands and wetlands; and undeveloped hills and prairie land. It is a complex Superfund site, with numerous sources of contamination and varied circumstances for exposures still present even after considerable cleanup work has been completed. Remaining human health and environmental risks are consequences of the site's sheer size and complexity combined with many decades of relatively uncontrolled emissions, direct discharges, and seepage or leakage from plant processes.

Response actions taken pursuant to the ROD and AOC, however, have accomplished much in terms of eliminating sources of contamination and reducing exposure to metals and arsenic in the air, water, soils, crops, and livestock. Protection of human health has been EPA's principal concern at East Helena, particularly interrupting sources of and pathways for lead exposure among children.

The remedial actions required by the Process Ponds Operable Unit ROD, discussed earlier in this report, were carried out over the past few years. Several major sources of contamination to shallow groundwater and surface water no longer exist. Known leaks or seeps from underground pipes were repaired, although some leakage persists today. Extensive monitoring of groundwater, both on the plant site and in aquifers down the hydraulic gradient, is ongoing and will continue for as long as necessary, allowing any further migration or buildup of contaminants to be detected early.

The remedial actions carried out for the process ponds and process fluids circuitry address all immediate threats, but the remedy is not yet fully protective. More work may be needed in this area to ensure long-term protection of groundwater and surface water. As part of the RCRA corrective action measures that EPA is requiring at the Site, ASARCO is conducting additional monitoring in the process ponds and fluids circuitry area and reevaluating whether additional action may be necessary to address contamination.

The response actions required by the AOC for a non-time critical removal action directed at contaminated residential soils and some undeveloped lands adjacent to residential areas, also discussed earlier in this report, were carried out over the past few years and continue on a limited, as-needed basis to this day. The principal threats to human health arising from contaminated soils, as well as street and household dust, have been significantly reduced–practically eliminated–by this response action.

Section 2.3.1 of this report summarizes and illustrates the success of the residential soils response action working in concert with the community-based education and abatement program. As demonstrated by the reduction in children's lead-to-blood ratios that has occurred over the past few years, Region VIII believes this aspect of Superfund work in East Helena has produced impressive results. While the potential for exposures in the future has not been entirely

eliminated, an effective, proactive, and adequately funded community-based education and abatement program will ensure that families with children, or expecting children, will be identified and contacted by health professionals immediately upon moving onto property that has not been sampled or property that is known to have soil lead concentrations above health-based levels for children. If necessary, appropriate action can then be taken without delay under existing Superfund authority.

EPA believes that the response actions being carried out for residential soils are addressing the immediate threats, but the remedy is not yet fully protective. Responses in marginal areas will continue as needed, thus enhancing protectiveness overall; the community-based education and abatement program will continue to function for years into the future. No additional response appears to be warranted beyond the actions required, although a final ROD will be issued within the next 2 years, formalizing these processes and any institutional controls deemed necessary.

The remedial investigation and subsequent actions by ASARCO, discussed earlier in this report, resulted in the conclusion by EPA that the slag pile, despite its mass, is not a significant source of metals or arsenic to the groundwater, surface water, or air. No direct remedial measures for the slag pile appear to be warranted at this time; however, as with other aspects of this operating facility, monitoring of the slag pile will continue under RCRA authority.

Actions were taken by ASARCO to eliminate the former ore storage areas as sources of fugitive emissions and sources of runoff contamination or seepage. While problems were substantially reduced by construction of a large ore storage and handling building, ASARCO continues to store concentrates outside, so the potential for contamination to groundwater may continue. Under the oversight of EPA's air and RCRA programs, ASARCO is planning to conduct further investigations and is building additional run-on and runoff controls for the outside storage areas.

Possible threats arising from stormwater runoff (from the plant site to groundwater or Prickly Pear Creek) have been greatly reduced by construction of a stormwater routing and collection system adjacent to the plant. This system was recently permitted and is overseen by the State of Montana and no further action appears to be warranted.

5.0 Next Five-Year Review

The next Five-Year Review will be conducted no later than October 2003, but may be conducted earlier at EPA's discretion.

6.0 References

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1. Some portions of the Risk Assessment were not approved by EPA.